A review of *Dibrachia* Sinev & Sruoga, 1992, a subgenus of *Elachista* (Elachistidae: Elachistinae)

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Abstract. The systematic position of the *Elachista* subgenus *Dibrachia* Sinev & Sruoga, 1992 is revised on the basis of a novel anatomical interpretation of the male juxta-valval process complex in the constituent species. The taxonomy of the species is outlined and new distributional data are presented. Five species are recognised, the following two of which are described as new: *Elachista alicanta* sp. n. (Spain) and *Elachista elksourensis* sp. n. (Tunisia). A redescription and diagnosis are given for all included species.

Key words. Elachistidae, Elachistinae, *Elachista*, *Dibrachia*, systematics, genital morphology, juxta-valval process complex, new species

Introduction

The *Elachista* subgenus *Dibrachia* Sinev & Sruoga, 1992 (Elachistidae: Elachistinae) is a small and structurally uniform group of Elachistinae moths distributed in the Palaearctic area. They are confined to xerothermic habitats and their known diversity is highest in the Mediterranean area. The present knowledge of their sites of occurrence indicates that they seem to occur in limestone areas in particular. The immature stages are not known for any of the species. The representatives of subgenus *Dibrachia* are characterised by their peculiarly shaped male genitalia with reduced uncus, uniquely developed and paired comb-shaped gnathos, and broad valvae. Externally, the three previously recognised species are unicolorously white, thus resembling some representatives of *Elachista* subgenus *Aphelosetia* Stephens, 1834. Examination of extensive unidentified samples of Elachistinae has revealed the existence of two new species attributable to subgenus *Dibrachia*.

The three previously recognised species, originally placed in *Elachista* (Chrétien 1908; Parenti 1978; Traugott-Olsen 1990), were transferred to their own genus (*Dibrachia*) owing to their peculiar genital features by Sinev & Sruoga (1992). Kaila (1999) shifted the rank of *Dibrachia* to that of a subgenus of *Elachista* on the basis of a phylogenetic analysis of the subfamily. In this analysis *Dibrachia* came up as the sister group of the clade containing *Elachista* subgenera *Hemiprosopa* Braun, 1948 and *Aphelosetia*.

A detailed scrutiny on the genital morphology of all five species led me to re-consider the anatomic interpretation of the juxta-valval process complex in *Dibrachia*. These species appear to share characteristics that are different from those of all other *Elachista* species. These structures had seemingly passed unnoticed by Parenti (1972), Kaila (1999), and partly also by Sinev & Sruoga (1992), all of whom had predominantly studied *E. kalki* Parenti, 1978, in which these structures are more like those of the 'usual' *Elachista* type. These structures had also partly been incorrectly interpreted by Traugott-Olsen (1990) in the description of *Elachista anatoliensis* (for details, see *Remarks* under the redescription of *E. anatoliensis*). In this paper the male juxta-valval

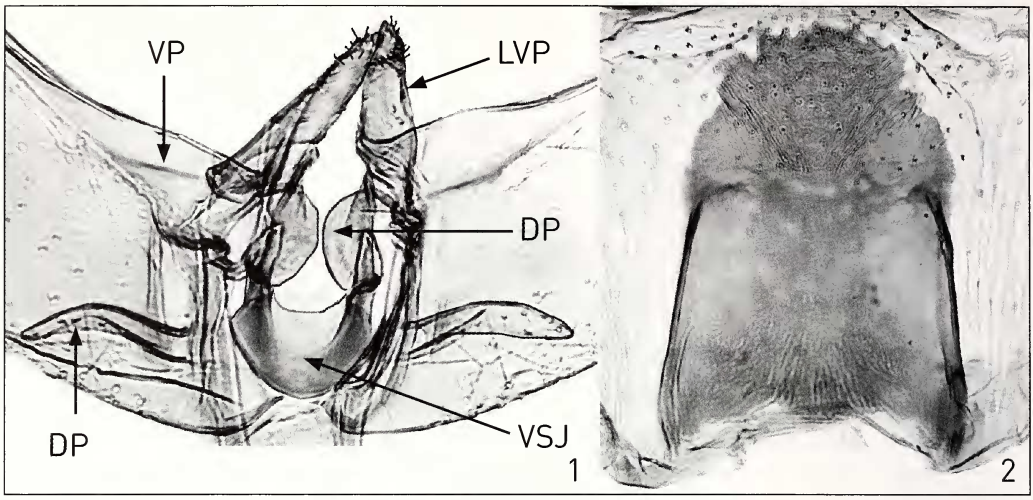


Fig. 1. The juxta – valval process complex of *Elachista* (*Dibrachia*) *alicanta* sp. n. with explanations of anatomic structures. DP digitate process; JL juxta lobes; LVP lobe of valval process; VP valval process; VSJ ventral shield of juxta.
Fig. 2. Sternum II of *Elachista kalki* (L. Kaila prep. n. 4258).

process complex of *Dibrachia* is described in detail and its significance regarding the phylogenetic position of *Dibrachia* is evaluated. The two new species are described and the three previously recognised species are redescribed.

Material and methods

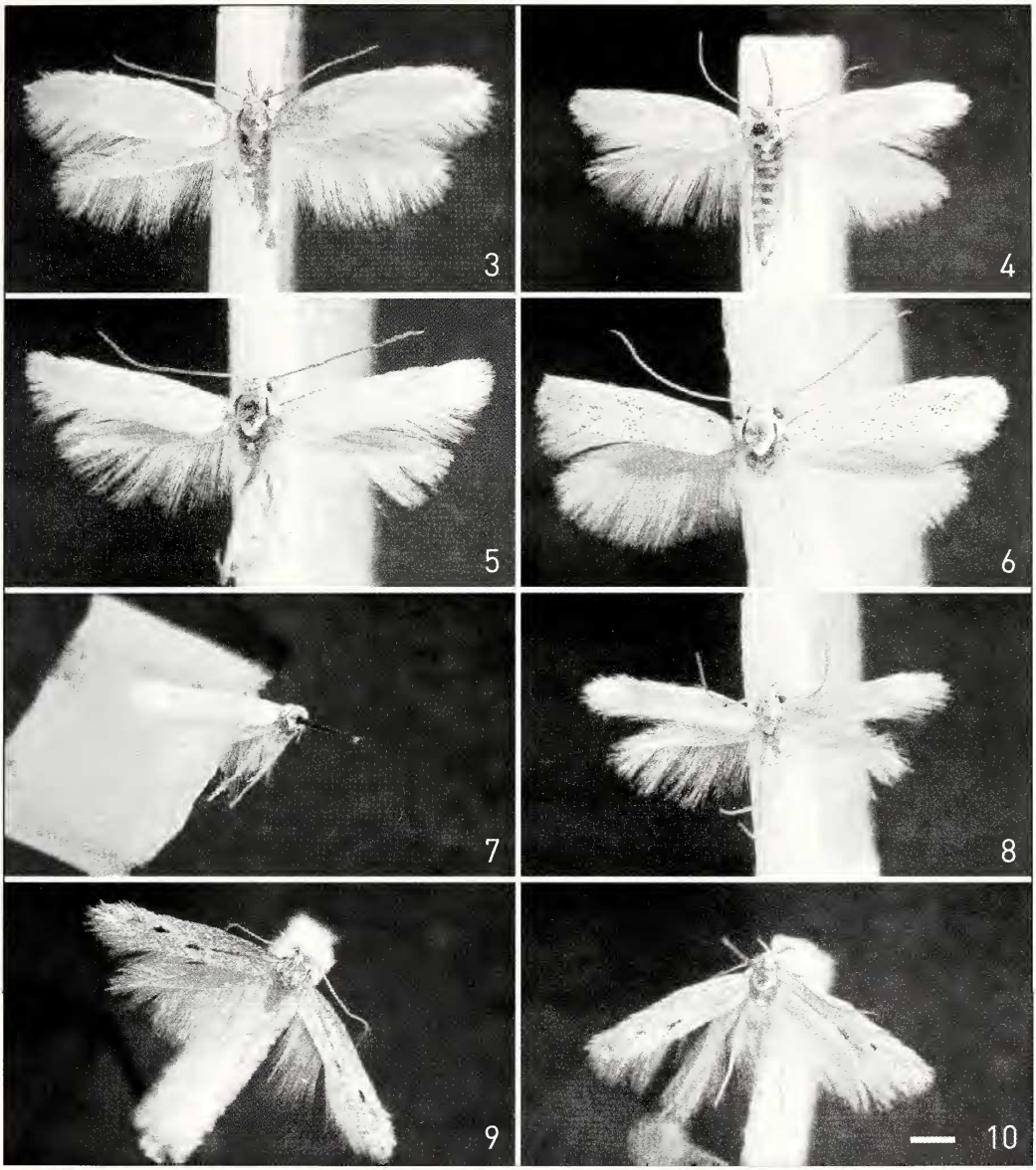
The terminology for morphological structures follows Traugott-Olsen & Schmidt Nielsen (1977) and Kaila (1999). The forewing length was measured from the base of the wing to the end of the fringe. Apart from the material studied for the present study, the described distribution of the included species over European countries follows Kaila (2004b). This paper is based on material obtained from the following collections:

TLMF Tiroler Landesmuseum Ferdinandeum, Innsbruck, Austria (P. Huemer).
MZH Zoological Museum, Finnish Museum of Natural History, University of Helsinki, Finland (L. Kaila).
SZMN Siberian Zoological Museum, University of Novosibirsk, Russia (V. V. Dubatolov).
ZMUC Zoological Museum, University of Copenhagen, Denmark (O. Karsholt).

Private collections of following persons: Jari Junnilainen (Vantaa, Finland), Jari Kaitila (Vantaa, Finland), Kari and Timo Nupponen (Espoo, Finland), Zdeno Tokár (Michalovce, Slovak Republic), and Vadim Zolotuhin (Ul'yanovsk, Russia).

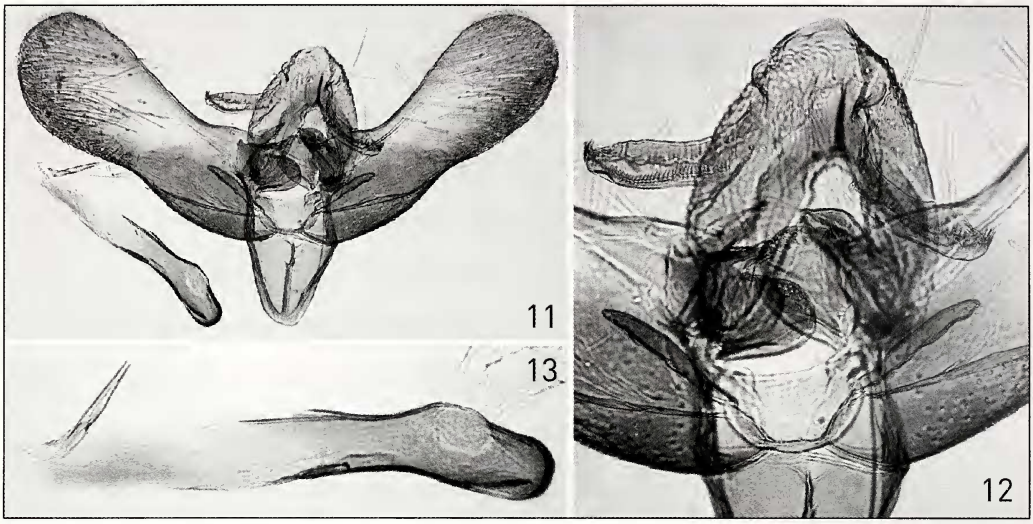
Systematic position of *Elachista* subgenus *Dibrachia*

In *Dibrachia kalki* the juxta lobes are bilobed and setose (cf. Parenti 1978: pl. 2; Figs. 12, 14). In other species of *Dibrachia* the lobes are entirely separate from each other, the 'real' juxta lobes are unsetose, and the other lobe is triangular or tongue-shaped



Figs. 3–10. Habiti of *Elachista* spp., scale 1 mm. **3.** *E. kalki* Parenti ♂ (Russia, S. Urals). **4.** *E. kalki* Parenti ♀ (Russia, S. Urals). **5.** *E. totalbella* Chrétien ♂ (Tunisia). **6.** *E. elksourensis* sp. n. ♂ holotype (Tunisia). **7.** *E. anatoliensis* Traugott-Olsen ♂ holotype (Turkey). **8.** *E. anatoliensis* Traugott-Olsen ♂ (Ürgüp, Turkey). **9.** *E. alicanta* sp. n. ♂ holotype (Spain). **10.** *E. alicanta* sp. n. ♀ paratype (Spain).

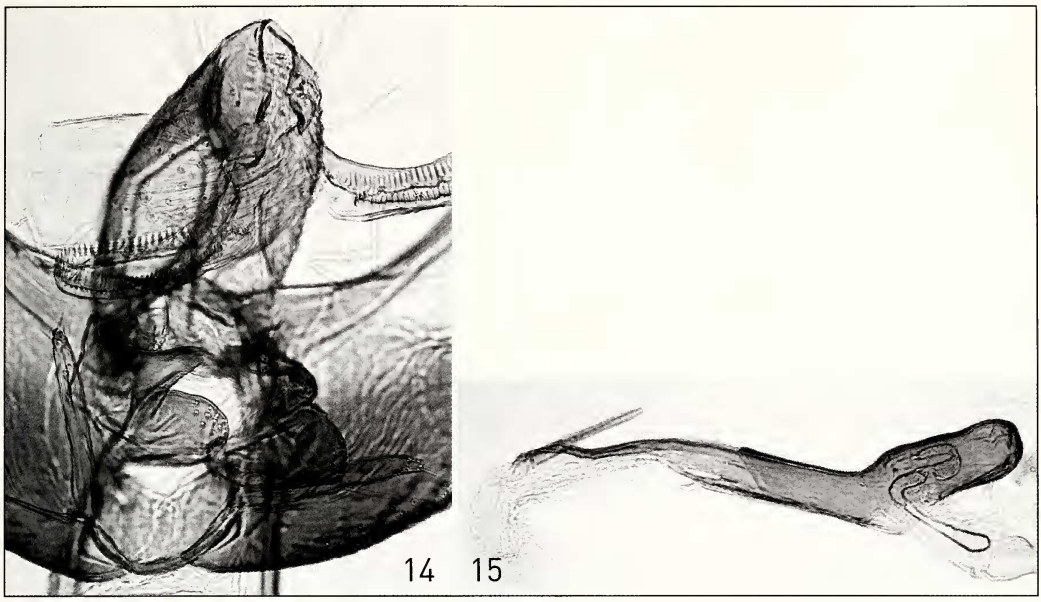
and apically setose (see Fig. 1 for explanations). This structure is similar to Kaila's (1999) character 51: 1 (valval process present as membranous connection between ventral surface of valva and juxta lobe that bears a tongue-shaped lobe medially). This characteristic was found to be a unique synapomorphy for the genus *Stephensia* Stainton, 1858 (Kaila 1999). It is not possible to evaluate whether the structure here called as the lobe of the valval process is really a derivative of the valval process



Figs. 11–13. Male genitalia of *Elachista kalki* (Greece, L. Kaila prep. n. 4013). **11.** General view. **12.** Details of uncus, gnathos, and juxta. **13.** Phallus.

or the juxta, and the terminological convention used here follows Kaila (1999). The ventral shield of the juxta of *Dibrachia* is typically sickle-shaped or semicircular with dorsolaterally directed extensions. The juxta lobes are connected to the ventral shield by a narrow joint. These characteristics appear unique to *Dibrachia*. Unlike other *Elachista*, the median plate of the juxta is simple, without folded margins, a condition that is primitive in the phylogenetic framework of Kaila (1999). The valval process is nearly membranous in *E. kalki*, but to some extent sclerotised in the other species of the subgenus *Dibrachia*.

Since the publication of the phylogenetic analysis of the Elachistinae by Kaila (1999) the data matrix has been updated by Kaila & Sugisima (2003, and unpublished data). This updating not only includes new outgroup taxa in accordance with Kaila (2004a), but also 35 additional ingroup taxa, many new characters, and a revision of some codings and character state definitions. The revised data matrix will be published in another context (Kaila & Sugisima, in preparation). A preliminary re-analysis of the revised data matrix in its present, yet incomplete form, with novel and revised findings regarding *Dibrachia* incorporated, was executed for evaluating the position of *Dibrachia*. The outcome (not shown) indicates that the monophyletic *Dibrachia* may be the basal lineage of *Elachista*. It would also indicate that the lobe of the valval process is of independent origin in *Stephensia* and *Dibrachia*, respectively. The position of *Dibrachia* indicates that the originally weakly supported monophyly of the clade containing subgenera *Dibrachia*, *Hemiprosopa* and *Aphelosetia* (Kaila 1999) would be broken. This position could allow the recognition of *Dibrachia* again as a genus, following Sinev & Sruoga (1992). However, such a change is not suggested here for the following reasons. Firstly, this result is based on a preliminary analysis of an incomplete data set. Secondly, the immature stages of *Dibrachia* and *Hemiprosopa* still remain unknown, a situation which unavoidably hampers our understanding of the position of these groups. Thirdly, the monophyly of *Elachista* s. l. seems much



Figs. 14–15. Male genitalia of *Elachista kalki* (Russia, Urals). **14.** Details of uncus, gnathos and juxta (L. Kaila prep. n. 4257). **15.** Phallus (L. Kaila prep. n. 4258).

better supported than the interrelationships of the constituent subgenera. This finding indicates that further modifications to the data matrix could easily again change their position, while the monophyly of *Elachista* s. l. is less likely challenged. Therefore, the nomenclatorial stability is better maintained if no changes are now made.

Diagnosis of *Elachista* subgenus *Dibrachia*

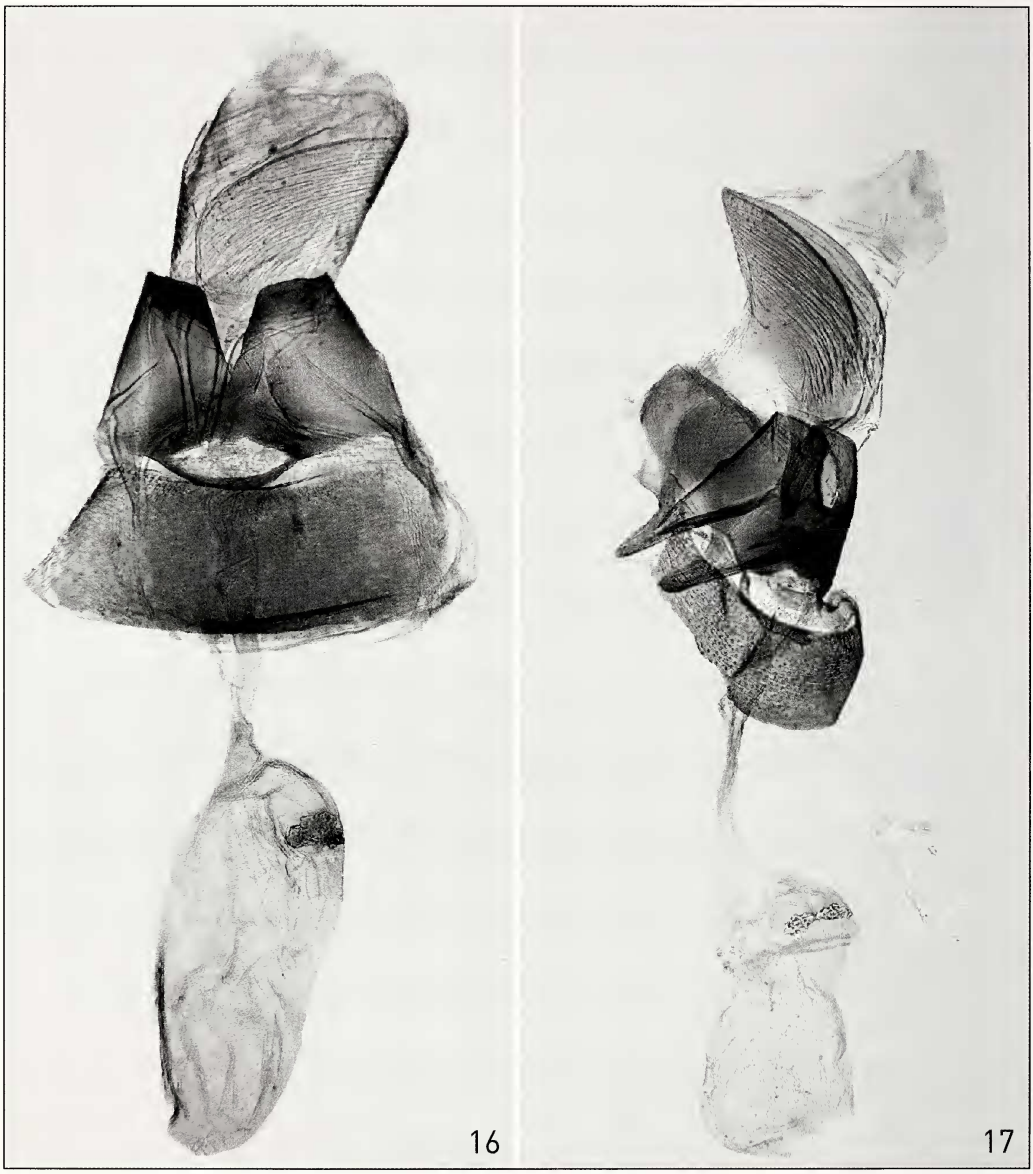
Notes on the distribution of some characters within Elachistinae are mentioned within brackets [].

Head. Smooth-scaled, neck tuft weakly raised. Tongue basally scaled, length less than diameter of head. Maxillary palpi vestigial, 2-segmented. Lateral external ocelli absent. Antenna extended to about 2/3 of forewing, scape basally with pecten consisting of numerous elongate, stiff hair-like scales; flagellum without visible ciliation. Length of labial palpus 0.8–1.5 times diameter of head.

Thorax. Forewing acute; five costally directed R-veins present; M1 stalked with R; M2 free, from end of cell; CuA1 and CuA2 present. Hindwing lanceolate, cell open; M2, CuA1 and CuA2 on common stalk. Tarsal articles with three stout spines distally, spines sometimes also present on ventral surface of tarsal articles of mid- and hindleg.

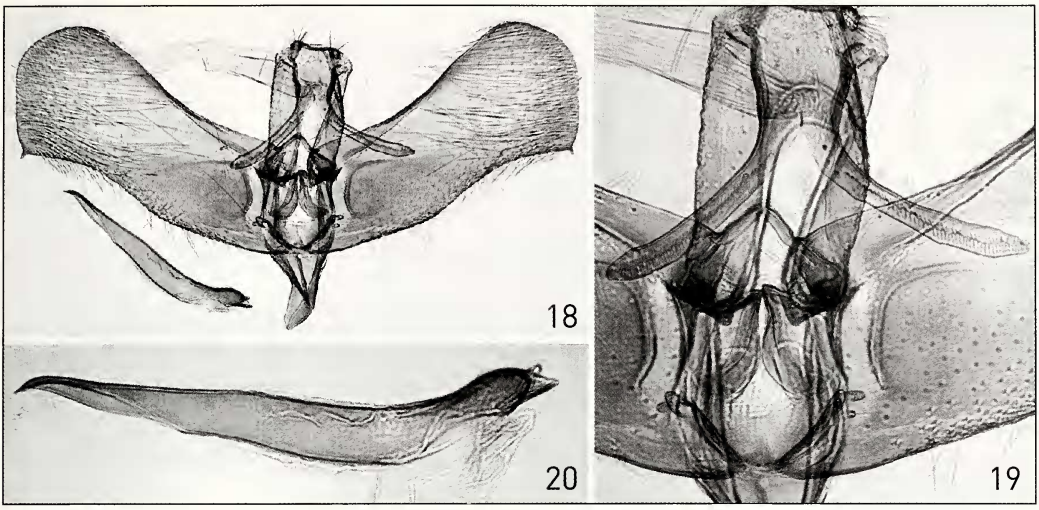
Pregenital abdomen. Sternum 2 with long and narrow, well distinguished sternal rods [also in *Stephensia* and some species in *Elachista* subgenus *Aphelosetia*], without apodemes (Fig. 2). Anterior margin of male tergum 8 sclerotised, without further modifications.

Male genitalia. Uncus lobes vestigial, present at most as low triangular, setose swellings. Socius present as a small group of small setae. Basal arms of gnathos fused medially; lobes of spinose knob of gnathos separate, elongate, tongue-shaped, with



Figs. 16–17. Female genitalia of *Elachista kalki*. **16.** L. Kaila prep. n. 4261 (Russia, Ul'yanovsk). **17.** L. Kaila prep. n. 4260 (Russia, Tuva).

comb-like longitudinal double row of spines. Without sclerotised anellus. Transtilla made of medially projected hook-like appendices of valval costa. Valva with more or less sclerotised valval process on ventral surface; also with tongue-shaped or triangular setose lobe between juxta lobe and valval process [also in *Stephensia*]. Costa unfolded [usually in *Elachista* the costal sclerotisation forms distinctive basal and distal folds]. Cucullus expanded, rounded, often with small spine at end of indistinct sacculus. Median plate of juxta sickle-shaped or oval, without lateral foldings, dorsolaterally extended



Figs. 18–20. Male genitalia of *Elachista totalbella* Chrétien (Tunisia, L. Kaila prep. n. 4142). **18.** General view. **19.** Details of uncus, gnathos and juxta. **20.** Phallus.

to give lateral support for phallus, without median or lateral pockets. Juxta lobes of variable shape, widely placed apart from each other, narrowly connected to median plate of juxta, distinctly sclerotised, ventral surface distally with or without group of setae. Dorsal shield of juxta absent. Elongate tongue-like, setose digitate process between median plate of juxta and ventral surface of valva present and fully developed, vestigial, or absent. Phallus not ankylosed, with or without manica; sometimes with cornuti.

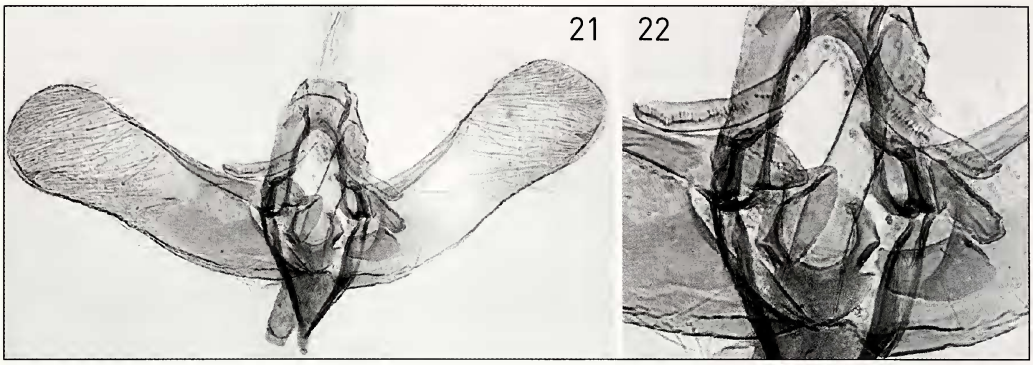
Female genitalia. Papillae anales sclerotised, dorsodistally fused, forming a sharp blade [papillae anales similarly dorsodistally fused in *Perittia* and *Elachista dissona* Kaila], sparsely covered by sensilla; lacking microtrichiae [microtrichiae absent also in *Perittia*, *Urodeta*, and *Elachista dissona* Kaila]. Posterior margin of sternum 8 reinforced, with deep mesal incision. Ostium bursae situated on sternum 8. No antrum present; ductus seminalis membranous, tubular, incepted to ductus bursae cephalad of colliculum; ductus bursae tubular, straight; corpus bursae with internally directed spiculae; with one dentate signum of variable shape.

The species of *Elachista* subgenus *Dibrachia*

Elachista kalki Parenti, 1978 (Figs. 2–4, 11–17)

Elachista kalki Parenti, 1978: 20, pl. 2.
Dibrachia kalki (Parenti, 1978); Sinev and Sruoga 1992: 154.
Elachista (*Dibrachia*) *kalki* Parenti, 1978; Kaila 1999: 164.

Material. 1♂, 1♀ **Germany**, Kyffhäuser, Kosacken Berg 27.v.1939, Jäckh leg. (ZMUC). 1♂ **Greece**, 15 km W Konsani 16.v.1997, Selling leg. (Kaila prep. n. 4283) (ZMUC); 1♂, 1♀ Makedonia, 35 km S Grevena 24.v.2001, leg. et coll. Junnilainen (L. Kaila prep. n. 4013 ♂). 1♂ **Hungary,** Örkény 2.-3.v.2003 Richter leg., (coll. Tokár). 6♂ 2♀ **Russia**, S. Ural, Cheliabinsk oblast, 52°39'N 59°34'E, 350 m, Arkaim reserve near Amurskii village, 18.–19.v.2004, Nupponen leg. (coll. Nupponen & MZH); 6♂

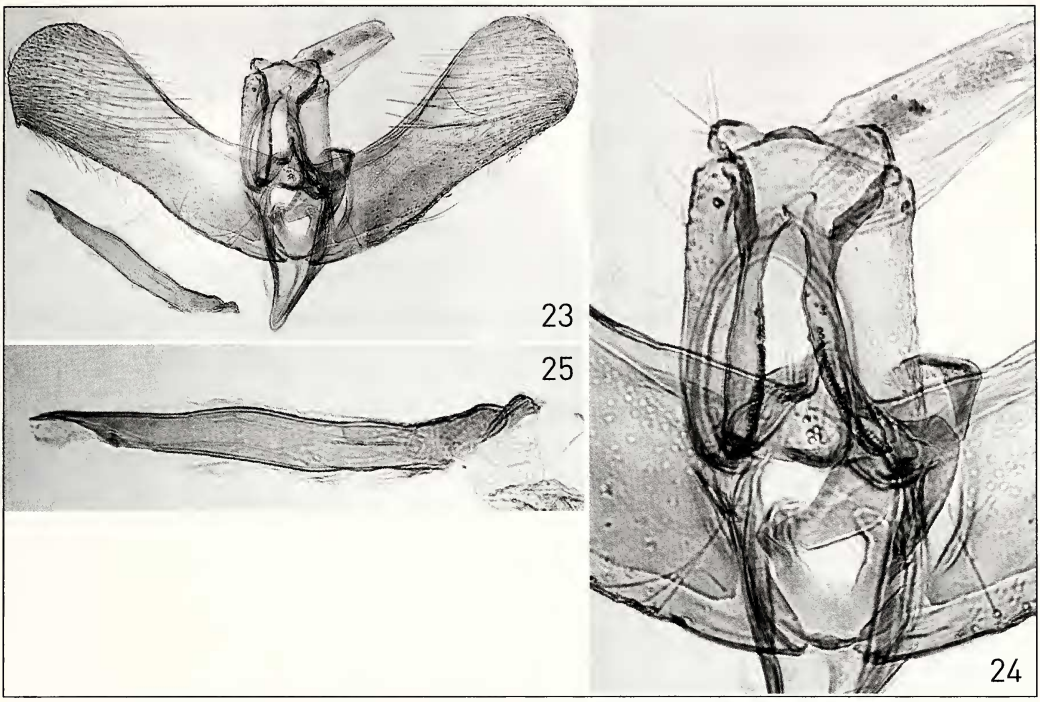


Figs. 21–22. Male genitalia of the holotype of *Elachista anatoliensis* Traugott-Olsen (ETO C.3.12.89). **21.** General view. **22.** Details of gnathos, and juxta.

Cheliabinsk oblast, 52°39'N 59°00'E, 300 m, 15 km S. Kizilskoye, near Ural river, 27.v.1998, Junnilainen leg., 30♂ same data, T. & K. Nupponen leg. (coll. Junnilainen, Nupponen, MZH); 1♂ Cheliabinsk oblast, 53°57'N 59°03'E, 650 m, near Moskovo village, 26.v.1998, Junnilainen leg. (coll. Junnilainen); 13♂ Orenburg oblast, 51°13'N 57°37'E, 350 m, 20 km S Mednogorsk, near Kidriasovo village 28.–29.v.1998, Junnilainen leg. (coll. Junnilainen); 2♂ same, T. & K. Nupponen leg. (coll. Nupponen); 3♂ Orenburg oblast, 51°23'N 56°49'E, 130–340 m, 6 km W. Donskoje village, Mount Verbljushka, 13.v.1999, Nupponen leg. (coll. Nupponen); 1♂ Cheliabinsk oblast, 53°59'N 61°12'E, 250 m, Troizkii reserve near Berlin village, 30.vi.1997, Nupponen & J. Junnilainen leg. (coll. Junnilainen, Nupponen); 6♂ 2♀ Orenburg distr. Arkaim near Amurskii village 18.–19.v.2004, Nupponen leg. (coll. Nupponen), 1♂, 1♀ in MZH); 3♂ 1♀ Ul'yanovsk obl., Akulovka, Nikolaevka distr. 150 km SWS Ul'yanovsk, limestone steppe, 53°06'N 47°29'E 16.v.1998, Zolotuhin leg.; 2♂ Vjazovka, 6 km S., Radishchevo distr., 166 km S Ul'yanovsk, 52°51'N 48°21'E, 6.–9.v.2000, Zolotuhin leg.; 1♂ Radishchevo distr., 160 km S Ul'yanovsk, 52°53'N 48°26'E 2.vi.1993, Zolotuhin leg.; 1♂, same data, 24.v.1994, Isajeva leg.; 1♂ Vjazovka, 8 km S., Radishchevo distr., 168 km S Ul'yanovsk, 52°50'N 48°18'E, 4.v.2002, Isajeva leg. (Specimens from Ul'yanovsk in coll. Zolotuhin and in MZH); 3♂ 3♀ Tuva rep. 50°16'N 94°54'E, 1250 m, 25 km W. Erzin, steppe/stony slopes, 7.–11.vi.1995, Jalava & Kullberg leg. (MZH).

Diagnosis. *Elachista kalki* is the most broad-winged of the *Dibrachia* species (Figs. 3–4), and its labial palpi are shorter than in the other species, at most as long as the diameter of the head. Its forewings are shiny white; the sheen distinguishes it from nearly all other white *Elachista* species, except *E. galacticella* Eversmann of subgenus *Aphelosetia*. These species are externally readily identifiable by the presence of the uncus in the male of *E. galacticella*, which can be seen without brushing the abdomen. The females of these species are identified by the blackish blade-shaped papillae anales of *E. kalki*, also visible without brushing. The male genitalia of *E. kalki* differ from those of other *Dibrachia* species by the very vestigial unsetose uncus, the valva without any distal spine on the cucullus, the setose juxta lobes, and the long straight cornutus on the vesica (Figs. 11–15).

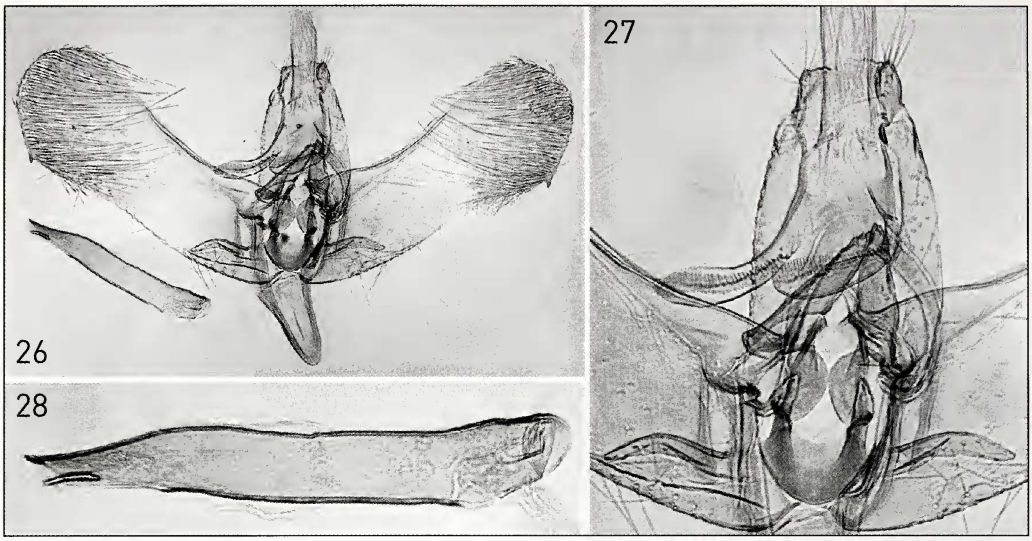
Description. Forewing length of ♂ 4.8–5.5 mm, ♀ 4.8–5.2 mm. Length of labial palpus 0.8–1.0 times diameter of head, almost straight, greyish white. Scape dense, white, pecten white, pedicel and flagellum grey. Head varying from grey to pale ochreous. Neck tuft, patagia, and thorax greyish white. Whole antenna concolorous with head. Abdominal segments basally shiny light grey, distally white. Fore- and midleg inwardly pale, outwardly pale or leaden grey, hindleg ochreous white. Forewing broad, unicolorous shiny white except basal 1/5 of costa narrowly dark grey; fringe concolorous. Hindwing pale grey, translucent; fringe white. Underside of fore- and hindwings grey, fringe white.



Figs. 23–25. Male genitalia of *Elachista anatoliensis* (Turkey, Ürgüp, L. Kaila prep. n. 3909). **23.** General view. **24.** Details of uncus, gnathos, and juxta. **25**. Phallus.

Male genitalia. Uncus lobes vestigial. Lobes of the spinose knob of gnathos separate, tongue-shaped, with comb-like longitudinal double row of spines, length 1/4 length of valva. Valva narrowest medially, three times longer than wide at narrowest point, with somewhat sclerotised valval process on ventral surface; costal sclerotisation unfolded; sacculus basally somewhat swollen, s-shaped, without distal spine, cucullus expanded, rounded. Ventral shield of juxta semicircular, dorsolaterally extended; juxta lobes widely set apart from each other, narrowly connected to median plate of juxta, broad, cusp-like, distally setose; triangular setose lobe present between juxta lobe and valval process. Digitate process narrow, straight, setose, 1/5 length of valva. Vinculum u-shaped, with distinctive median ridge. Phallus 2/3 length of valva, basally bent, distally tapered to blunt dorsal lobe; blunt caecum with or without small manica; vesica with straight prominent cornutus.

Female genitalia. Papillae anales sclerotised, dorsodistally fused, forming a sharp blade, longitudinally wrinkled, sparsely covered by sensilla, lacking microtrichiae. Apophyses posteriores short, broad; apophyses anteriores very short, triangular. Posterior margin of sternum 8 reinforced, with narrow v-shaped median incision. Ostium bursae on anterior margin of sternum 8, surrounded by strong sclerotised ring. No antrum present; ductus seminalis membranous, tubular, incepted to ductus bursae cephalad of colliculum at posterior 1/3 length of ductus bursae; ductus bursae tubular, straight, as long as corpus bursae; corpus bursae with internally directed spiculae; with one dentate signum of variable shape.



Figs. 26–28. Male genitalia of the holotype of *Elachista alicanta* sp. n. (L. Kaila prep. n. 4193). **26.** General view. **27.** Details of uncus, gnathos, and juxta. 28. Phallus.

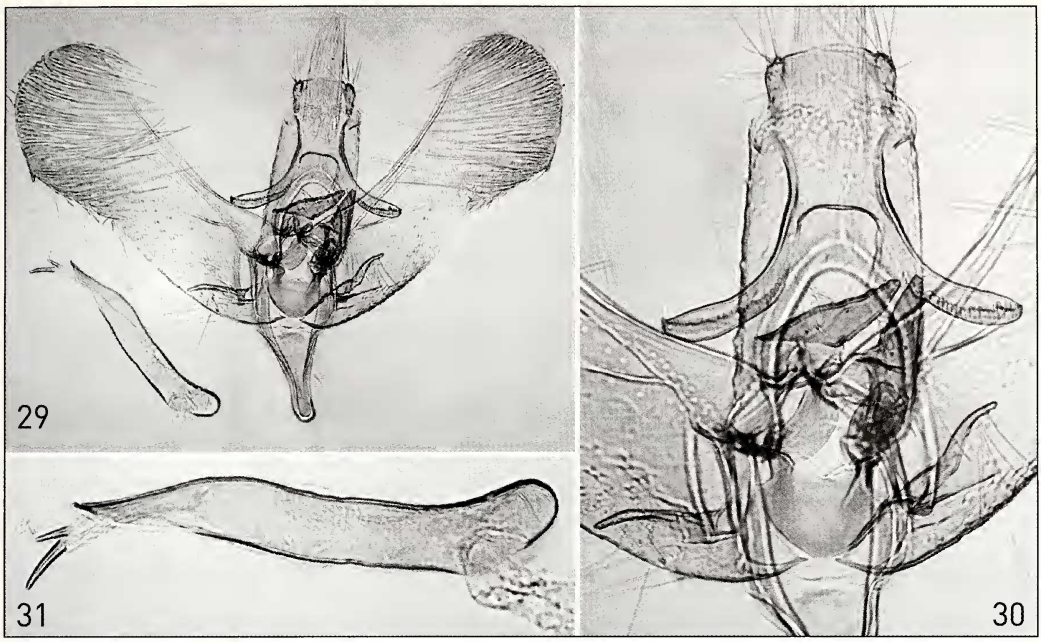
Life history. Adults have been collected at light on steppe slopes usually rich in limestone.
Distribution. Austria, Germany, Greece, Hungary, Italy, Kazakhstan (Sinev & Sruoga 1992), Russia (southern Urals, Volga region, Tuva Republic).
Remarks. New to Greece.

Elachista totalbella Chrétien, 1908 (Figs. 5, 18–20)

Elachista totalbella Chrétien, 1908: 203; Parenti 1972: 30, pl. 1 figs. A–D.
Dibrachia totalbella (Chrétien, 1908); Sinev and Sruoga 1992: 155.
Elachista (*Dibrachia*) *Dibrachia totalbella* Chrétien, 1908; Kaila 1999: 164.

Material. 1♂ **Tunisia**, Atlas Mts., Le Kef, chalk slope, 3.v.2000, leg. et coll. Nupponen.

Diagnosis. *Elachista totalbella* is a rather large unicolorous white species that can be identified most easily from the other *Dibrachia* species by its digitate process of male genitalia in the form of a small setose lobe (Fig. 19).
Description, ♂. Forewing length 5.2 mm. Length of labial palpus 1.3 times diameter of head, white, second segment slightly ochreous below. Head neck tuft, patagia, and thorax white. Scape dense, white, pecten white, pedicel and flagellum grey. Abdominal segments basally shiny light grey, distally white. Foreleg inwardly pale, outwardly mottled grey, mid- and hindleg ochreous white, tibia and tarsal articles outwards mottled grey, distally white. Forewing white except basal 1/5 costa narrowly dark grey, fringe concolorous. Hindwing dark grey, fringe white. Underside of forewing dark grey, fringe white; underside of hindwing dark grey on costal half and along Cu-vein, whitish on tornal half.



Figs. 29–31. Male genitalia of the paratype of *Elachista alicanta* sp. n. (L. Kaila prep. n. 4216). **29.** General view. **30.** Details of uncus, gnathos, and juxta. **31.** Phallus.

Male genitalia. Uncus lobes low triangular, setose. Lobes of spinose knob of gnathos separate, narrow, elongate, with comb-like longitudinal double row of spines, 1/3 length of valva. Valva narrowest medially, three times longer than wide at narrowest point, with somewhat sclerotised valval process on ventral surface; costal sclerotisation not folded; sacculus s-shaped, with small spine apically, cucullus expanded, rounded. Ventral shield of juxta sickle-shaped, dorsolaterally extended; juxta lobes widely set apart from each other, narrowly connected to median plate of juxta, distinctly sclerotised, without setae; triangular setose lobe present between juxta lobe and valval process. Digitate process vestigial, setose, accompanied [or flanked, surrounded?] by additional minute lobes (in studied specimen) that seem absent on lectotype. Vinculum narrow, u-shaped, with distinctive median ridge. Phallus 3/4 length of valva, basally bent, distally tapered to pointed, inwardly-curved apex; blunt caecum with bilobed manica; without cornutus.
Female. Unknown.
Life history. The specimen from Tunisia was collected with a light trap on a xerothermic limestone mountain (K. Nupponen, personal communication).
Distribution. Algeria, Tunisia.
Remarks. The genitalia of the lectotype male as well as those of a paralectotype female were illustrated by Parenti (1972). The male genitalia photos of Parenti (1972: figs. 1A–D) enable unambiguous identification. Therefore, the lectotype was not examined again in the present study. The characteristics of the female specimen illustrated by Parenti (1972: figs. 10A–C, E) disagree with those of the two other *Elachista* (*Dibrachia*)

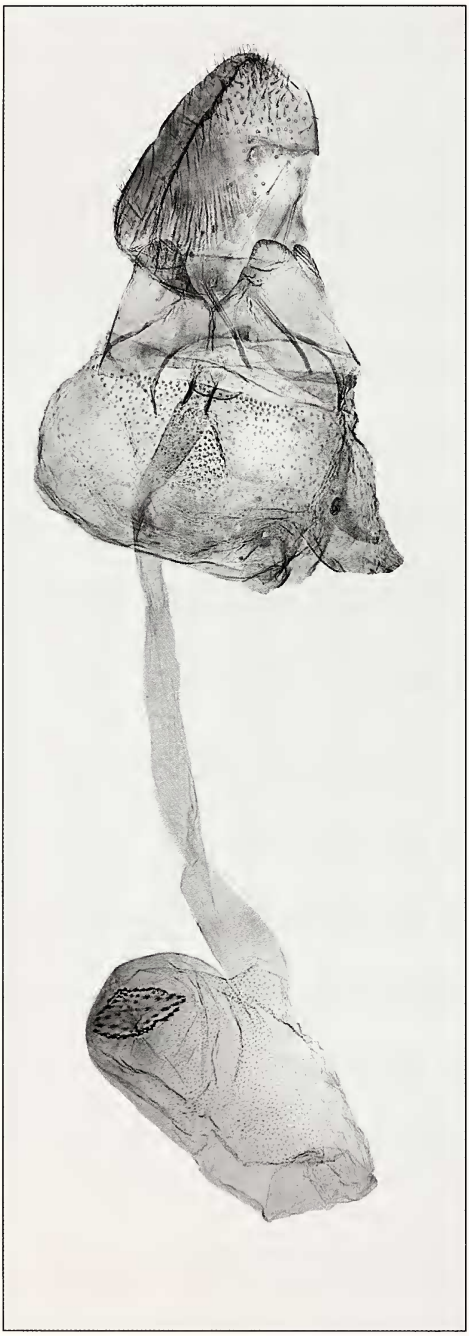


Fig. 32. Female genitalia of *Elachista alicanta* sp. n. (paratype, L. Kaila prep. n. 4222).

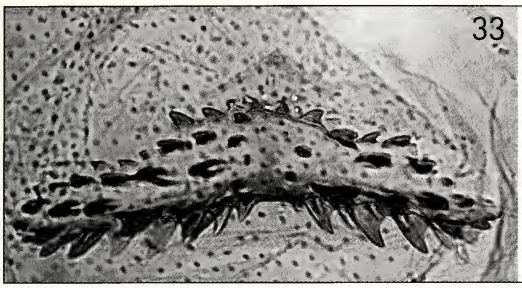
species for which the female is known, i.e. *E. kalki* and *E. alicanta*. In particular, the basally bulbous, unsclerotised papillae anales are quite different in shape, resembling those found in the *Elachista dispunctella* complex. On picture 10: A of Parenti (1972) also microtrichiae are discernible on the papillae anales. This is a typical feature of all *Elachista* species except those of subgenus *Dibrachia*. It is here presumed that the female paralectotype of *E. totalbella* actually is a member of *Elachista* subgenus *Apheloseti*a, probably in the *dispunctella* complex. Therefore, the true female of *E. totalbella* is considered unknown.

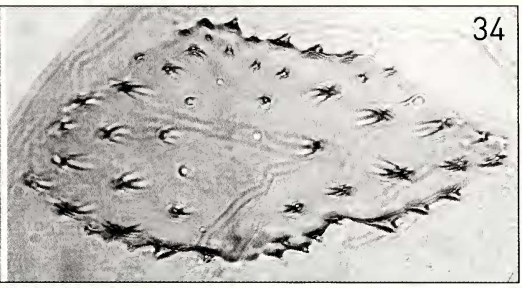
Elachista anatoliensis Traugott-Olsen, 1990 (Figs. 7–8, 21–25)

Elachista anatoliensis Traugott-Olsen, 1990: 275, figs. 3, 12, 13, 23, 24.
Dibrachia anatoliensis (Traugott-Olsen, 1990); Sinev and Sruoga 1992: 155.
Elachista (*Dibrachia*) *anatoliensis* Traugott-Olsen, 1990; Kaila 1999: 164.

M a t e r i a l. Holotype ♂, labelled: "Type" [rounded label with red margin], "genital praeparat | nr. C.3.12.89 sex: ♂ | E. Traugott-Olsen | WING praeparat | nr. B. 17.6.90 sex: ♂ | E. Traugott-Olsen", "Anatolia | Kizilcahaman | 1965", "*Elachista* | *anatoliensis* sp. n. | det. E. Traugott-Olsen" (TLMF). – 1♂ **Turkey**, Prov. Kayseri, 5 km NW Ercios Dagh., 2000 m, 22.vii.1986, Fibiger leg. (slide ETO E.19.6.89 [with identification label '*Elachista totalbella* Chrét. ETO det.]) (ZMUC); 1♂, same data, (slide A28.6.90 E. Traugott-Olsen, [with identification label '*E. anatoliensis* ETO det.]); 1♂ Ankara, Kizilcahaman, 20 km NW, 1200 m, 1.vii.1987, Fibiger leg. (slide G28.6.90 E. Traugott-Olsen, [with identification label '*E. anatoliensis* ETO det.]) (ZMUC); 2♂ Ürgüp, 30.vi.1998, Nupponen leg. (Kaila slides 3557, 3909) (coll. Nupponen, MZH). 1♂ **Turkmenistan**, Central part of the Kopetdagh Mts., 15 km W from Firyuza (now Poevryuze), Mt. Dushak, [2100 m, mountain xerophytous belt, *Juniperus* tree savanna-like forest], by light trap, 7.vii.1990, Dubatolov leg. (Kaila prep. n. 1682) (SZMN).

Diagnosis. An unicolorous white species that is externally separable from the similarly coloured species of subgenus *Dibrachia* as well as from the *Elachista* (*Apheloseti*a) *argentella* group by the very narrow forewings (Figs. 7–8). The genitalia also readily separate *E. anatoliensis* from the *E. argentella* group species. The genitalia of





Figs. 33–34. Signum of *Elachista alicanta* sp. n. **33.** Paratype, L. Kaila prep. n. 4217. **34.** Paratype, Kaila prep. n. 4222.

E. anatoliensis differ from other *Dibrachia* species as follows: The valva is longer and narrower than in the other species, being four times longer than wide, and the digitate process is absent. The juxta lobes are broader than in *E. totalbella* for which the digitate process is very small (Figs. 21–25).

Description, ♂. Forewing length 4.4–4.9 mm. Length of labial palpus 1.3 times diameter of head, white, second segment slightly ochreous below. Scape dense, white, pecten and pedicel of antenna white, flagellum grey. Head white, ochreous above; neck tuft, patagia and thorax white. Abdominal segments basally shiny light grey, distally white. Fore- and midleg inwardly pale, outwardly mottled grey, hindleg ochreous white, tibia and tarsal articles outwards mottled grey, distally white. Forewing very narrow, unicolorous white, fringe concolorous. Hindwing pale grey, somewhat translucent, fringe ochreous white. Underside of forewing grey, fringe white; underside of hindwing as upper side. Female unknown.

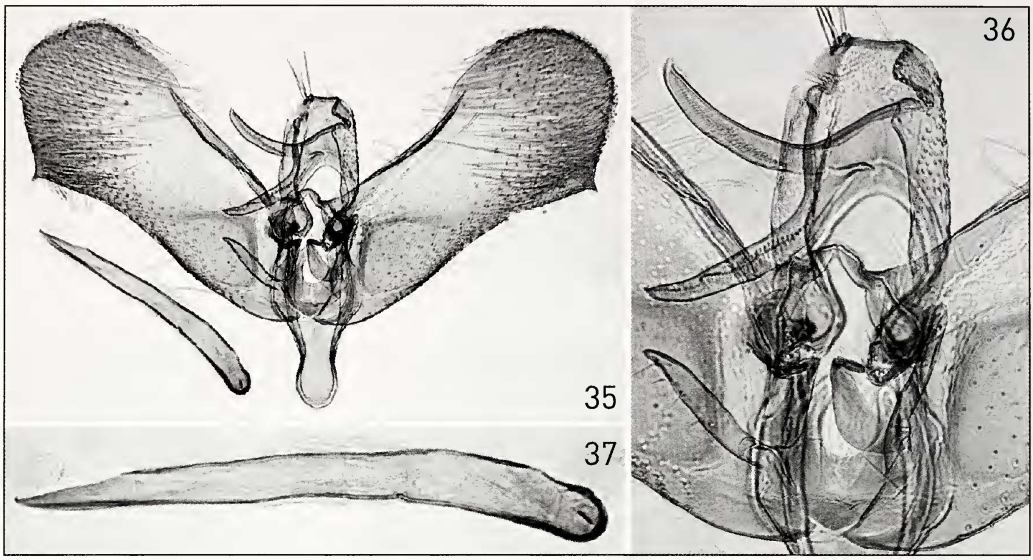
Male genitalia. Uncus lobes low, triangular, setose. Lobes of spinose knob of gnathos separate, narrow, elongate, with comb-like, longitudinal double row of spines, over 1/4 length of valva. Valva narrowest medially, four times longer than wide at narrowest point, with somewhat sclerotised valval process on ventral surface; costal sclerotisation not folded; sacculus weakly s-shaped, with small spine apically, cucullus expanded, rounded. Ventral shield of juxta sickle-shaped, dorsolaterally extended; juxta lobes widely set apart from each other, narrowly connected to median plate of juxta, distinctly sclerotised, without setae; triangular setose lobe present between juxta lobe and valval process. Digitate process absent. Vinculum narrow, v-shaped, with distinctive median ridge. Phallus 2/3 length of valva, basally bent, distally tapered to pointed, straight apex; blunt caecum with manica; vesica without cornuti.

Female. Unknown.

Life history. The specimens from Ürgüp were found in an area with exposed limestone (K. Nupponen, personal communication).

Distribution. Greece, Turkey, Turkmenistan.

Remarks. New to Turkmenistan. Traugott-Olsen (1990: fig. 24) mentions that *E. anatoliensis* possesses a paddle-shaped, unsetose digitate process. This structure is actually the juxta lobe (cf. Figs. 22, 24) and the structure interpreted to be the 'usual' juxta lobe as in *Elachista* in general is the lobe of the valval process.



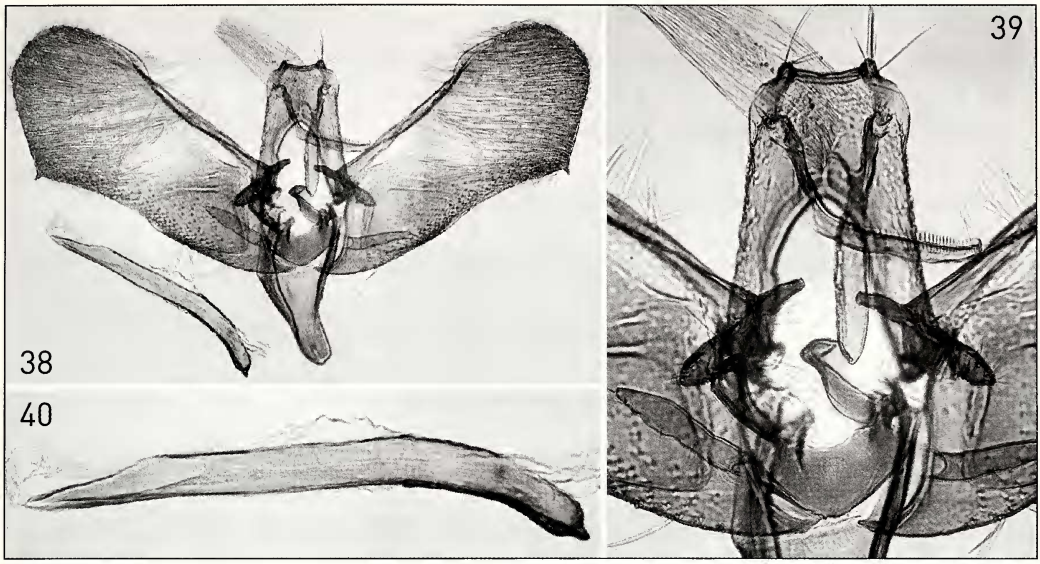
Figs. 35–37. Male genitalia of the holotype of *Elachista elksourensis* sp. n. (L. Kaila prep. n. 4141). **35.** General view. **36.** Details of uncus, gnathos, and juxta. **37.** Phallus.

Elachista alicanta sp. n. (Figs. 1, 9–10, 26–34)

Material. Holotype ♂: "Spanien, Alicante | Sierra de Crevillente | 5 km N. Albatera, 450 m | 38°15.22'N, 00°54,86'W | 23.v.2004 leg. P. Huemer leg. | TLMF2005-04", "L. Kaila | prep. no. 4193", "TLMF", "Holotype | *Elachista* | *alicanta* | Kaila" (TLMF). – Paratypes: 22♂, 15♀, same data as holotype, except 2♀ 24.v.2004, 5♀ 26.v.2004 (TLMF, 2♂ 2♀ MZH).

Diagnosis. A very narrow-winged species, like *E. anatoliensis*. The forewing colour is, however, mottled grey with distinct plical and discal spots, unlike any other species of subgenus *Dibrachia* which all share a typical silky white forewing ground colour (Figs. 9, 10). Externally, *E. alicanta* could rather be mixed with *Stephensia unipunctella* Nielsen & Traugott-Olsen, *E. fuscibasella* Chrétien of the *Elachista* (*Apheloseti*a) *argentella* group, or representatives of the *Elachista* (*Elachista*) *biatomella* complex, all of which may co-occur with *E. alicanta* in southern Spain. However the new species has narrower forewings than any of these species. The genitalia also readily separate these unrelated taxa, and the absence of a developed uncus is visible without dissection. From other *Dibrachia* species it is characterised by the following characteristics in the male genitalia: the digitate process is elongate and narrow, resembling that of *E. elksourensis*, but the phallus contains one or two small cornuti (Figs. 26–31).

Description. Forewing length of ♂ 5.0–5.5 mm, ♀ 4.0–4.5 mm. ♂: Labial palpus 1.5 times longer than diameter of head, bluish white, second and third segments fuscous below on distal halves. Head white, scales more or less dark grey-tipped above. Scape and pedicel of antenna covered with pale grey and dark grey-tipped scales, pecten leaden grey; flagellum grey, weakly annulated by slightly darker rings. Neck tuft, tegula, and thorax covered with pale grey and dark grey-tipped scales, abdomen ochreous grey. Legs inwardly pale grey, outwardly leaden grey, tibia and tarsal articles of hindleg with bluish white distal rings. Forewing narrow, ground colour appearing mottled grey due



Figs. 38–40. Male genitalia of the paratype of *Elachista elksourensis* sp. n. (L. Kaila prep. n. 4259). **38.** General view. **39.** Details of uncus, gnathos, and juxta. **40.** Phallus.

to basally greyish white and distally dark grey-tipped scales, basal 1/5 of costa dark grey; elongate black spot at 1/2 wing length on fold, another similar spot at 3/4 wing length in middle. Fringe basally greyish white, distally dark grey, with blackish fringe line. Hindwing grey with concolorous fringe. Underside of forewing dark grey, fringe paler with creamy tinge. Underside of hindwing as upper side. Female otherwise as male but forewing shorter and broader, paler, ground colour formed by basally white and distally grey scales.

Male genitalia. Uncus lobes low, triangular, setose. Lobes of spinose knob of gnathos separate, narrow, elongate, with comb-like longitudinal double row of spines, 1/4 of length of valva. Valva narrowest medially, three times longer than wide at narrowest point, with somewhat sclerotised valval process on ventral surface; costal sclerotisation not folded; sacculus weakly s-shaped, with small spine apically, cucullus expanded, rounded. Ventral shield of juxta semicircular, dorsolaterally extended; juxta lobes widely set apart from each other, narrowly connected to median plate of juxta, distinctly sclerotised, without setae; narrow, triangular and distally pointed setose lobe present between juxta lobe and valval process. Digitate process s-shaped, elongate and narrow, setose. Vinculum narrow, u- or v-shaped, with weak median ridge. Phallus 2/3 length of valva, basally bent, distally tapered to pointed, straight apex; blunt caecum without manica; vesica with one or two straight cornuti.

Female genitalia. Papillae anales sclerotised, dorsodistally fused forming sharp blade, basally longitudinally wrinkled, sparsely covered with sensilla, lacking microtrichiae. Apophyses posteriores short, narrow; apophyses anteriores very short, triangular, distally pointed. Posterior margin of sternum 8 reinforced, with u-shaped median incision. Ostium bursae at anterior margin of sternum 8, membranous. Without

antrum; ductus seminalis membranous, tubular, incepted to ductus bursae cephalad of colliculum at posterior 1/20 length of ductus bursae; ductus bursae tubular, straight, three times longer than corpus bursae; corpus bursae with internally directed spiculae; with one dentate signum variable in shape.

Life history. Specimens were collected flying freely at dusk while some were attracted to light. The habitat is a xerothermic steppe slope on calcareous soil.

Distribution. Only known from southern Spain.

Elachista elksourensis sp. n. (Figs. 6, 35–40)

Material. Holotype ♂: "Tunisia, Atlas Mtns. | Le Kef 40 km SE | nr. El Ksour village | dry meadow close to chalk | mine, 800 m, 02.v.2000 | K. Nupponen leg"., "L.Kaila | prep. no. 4141", "Holotype | *Elachista* | *elksourensis* | Kaila", coll. Nupponen. – Paratype: ♂, same data as holotype (Kaila prep. n. 4259), MZH.

Diagnosis. A white species for which the sharp black irroration characterises it within subgenus *Dibrachia* (Fig. 6). Externally it resembles large representatives of the *Elachista* (*Aphelosetia*) *dispunctella* complex, which, however, usually show forewing plical and discal spots, even though these are sometimes irregularly delimited. The genitalia, notably the externally discernible absence of a well-developed uncus, will immediately distinguish *E. elksourensis* from them. From other *Dibrachia* species it is characterised by the following characteristics in the male genitalia: the digitate process is elongate as in *E. alicanta*, but the phallus contains no cornuti (Figs. 35–40).

Description, ♂. Forewing length 5.0 mm. Length of labial palpus 1.3 times diameter of head, white, second segment slightly ochreous – fuscous below. Scape, pecten, and pedicel of antenna white, flagellum grey. Head, neck tuft, patagia, and thorax white. Abdominal segments basally shiny light grey, distally white. Fore- and midleg inwardly pale, outwardly mottled grey, hindleg ochreous white, tibia and tarsal articles outwards mottled grey, distally white. Forewing white, irregularly irrorated with black-tipped scales especially in median and distal area, basal 1/5 costa narrowly dark grey; fringe white. Hindwing grey, fringe ochreous white. Underside of forewing leaden grey, fringe white; underside of hindwing as upper side. Female unknown.

Male genitalia. Uncus lobes low triangular, setose. Lobes of spinose knob of gnathos separate, narrow, elongate, with comb-like longitudinal double row of spines, 1/5 length of valva. Valva narrowest medially, three times longer than wide at narrowest point, with somewhat sclerotised valval process on ventral surface; costal sclerotisation not folded; sacculus weakly s-shaped, with small spine apically; cucullus expanded, rounded. Ventral shield of juxta sickle-shaped, dorsolaterally extended; juxta lobes widely set apart from each other, narrowly connected to median plate of juxta, distinctly sclerotised, without setae; triangular setose lobe present between juxta lobe and valval process. Digitate process elongate tongue-shaped, setose, distally obliquely tapered. Vinculum narrow, u-shaped, distally broadened, with indistinct median ridge. Phallus 2/3 length of valva, basally bent, distally tapered to pointed, straight apex; blunt caecum without or with small manica; without cornutus.

Female. Unknown.

Life history. The specimens were collected in a dry treeless meadow close to chalk mine. The area is calcareous, although no exposed limestone was visible on the surface.
Distribution. Only known from Tunisia, Atlas Mts.

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References

Chrétien, P. 1908. Description de nouvelles espèces de Microlépidoptères d'Algérie. – Bulletin de la Société entomologique de France **1908**: 201–203.

Kaila, L. 1999. Phylogeny and classification of the Elachistidae s.s. (Lepidoptera: Gelechioidea). – Systematic Entomology **24**: 139–169.

Kaila, L. 2004a. Phylogeny of the superfamily Gelechioidea (Lepidoptera: Ditrysia): an exemplar approach. – Cladistics **20**: 303–340.

Kaila, L. 2004b. Fauna Europaea: Elachistidae. – *In*: Fauna Europaea: Lepidoptera, Moths. – Fauna Europaea version 1.1, http://www.faunaeur.org

Kaila, L. & K. Sugisima 2003. Phylogeny of Elachistinae (Lepidoptera: Gelechioidea: Elachistidae) revisited. – *In*: Abstracts of the 21st annual meeting of the Willi Hennig Society. – Cladistics **19**: 154–155.

Parenti, U. 1972. Revisione degli Elachistidi (Lepidoptera, Elachistidae) paleartici. I. Tipi di Elachistidi del Museo di Storia naturale di Parigi. – Bollettino del Museo di Zoologia dell'Università di Torino **1972** (2): 29–56.

Parenti, U. 1978. Nuove specie paleartiche del Genere *Elachista* Treitschke (Lepidoptera, Elachistidae). – Bollettino del Museo di Zoologia dell'Università di Torino **1978** (4): 15–26.

Sinev, S. Y. & V. A. Sruoga 1992. A new genus of Elachistid moths (Lepidoptera, Elachistidae) in the Palearctic fauna. – Zoologischeskij Zhurnal **71**: 153–156.

Traugott-Olsen, E. 1990. Descriptions of four new species of Elachistidae (Lepidoptera) and diagnoses of *Elachista pollutella* Duponchel, 1843 and *Elachista constitella* Frey, 1859. – SHILAP Revista de lepidopterologica **18**: 273–285.

Traugott-Olsen, E. & E. Schmidt Nielsen 1977. The Elachistidae (Lepidoptera) of Fennoscandia and Denmark. – Fauna Entomologica Scandinavica **6**: 1–299, Klampenborg, Denmark.